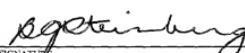


FORM PTO-1390 (REV 10-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER
				TS0764 US
				U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
				09/831038
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				
INTERNATIONAL APPLICATION NO. PCT/EP99/08901		INTERNATIONAL FILING DATE 5 November 1999		PRIORITY DATE CLAIMED 6 November 1998
TITLE OF INVENTION SEPARATUS APPARATUS				
APPLICANT(S) FOR DO/EO/US DIRKSE, Hendrik Arien; DRIES, Hubertus Wilhelmus Albertus; STEIN, Louis Edward				
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).</li> <li><input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).</li> <li><input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)).             <ol style="list-style-type: none"> <li><input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</li> <li><input type="checkbox"/> has been communicated by the International Bureau.</li> <li><input checked="" type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li><input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</li> <li><input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).             <ol style="list-style-type: none"> <li><input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</li> <li><input type="checkbox"/> have been communicated by the International Bureau.</li> <li><input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li><input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li><input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li><input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li><input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol> <p><b>Items 11 to 16 below concern document(s) or information included:</b></p> <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li><input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li><input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.             <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li><input type="checkbox"/> A substitute specification.</li> <li><input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li><input checked="" type="checkbox"/> Other items or information: postcard</li> </ol>				

U.S. APPLICATION NO. (If known) <b>097831038</b>	INTERNATIONAL APPLICATION NO PCT/EP99/08901	ATTORNEY'S DOCKET NUMBER TS0764 US
<input checked="" type="checkbox"/> The following fees are submitted:		
<b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b>		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$1000.00</b>		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$860.00</b>		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$710.00</b>		
international preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$690.00</b>		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$100.00</b>		
<b>ENTER APPROPRIATE BASIC FEE AMOUNT</b> = <b>\$860.00</b>		
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		
CLAIMS	NUMBER FILED	NUMBER EXTRA
Total Claims	8 - 20 =	0
Independent Claims	1 - 3 =	0
Multiple dependent claim(s) (if applicable)		+ \$270.00
<b>TOTAL OF ABOVE CALCULATIONS</b> = <b>\$860.00</b>		
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.		
<b>SUBTOTAL</b> = <b>\$</b>		
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		
<b>TOTAL NATIONAL FEE</b> = <b>\$</b>		
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property)		
<b>TOTAL FEES ENCLOSED</b> = <b>\$900.00</b>		
		Amount to be refunded: charged: <b>\$900.00</b>
a. <input type="checkbox"/> A check in the amount of <b>\$</b> _____ cover the above fees is enclosed.		
b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>19-1800</u> in the amount of <b>\$900.00</b> to cover the above fees. A duplicate copy of this sheet is enclosed.		
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-1800</u> . A duplicate copy of this sheet is enclosed.		
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>		
SEND ALL CORRESPONDENCE TO:		
Beverlee G. Steinberg SHELL OIL COMPANY INTELLECTUAL PROPERTY P. O. BOX 2463 HOUSTON, TX 77252-2463	 SIGNATURE Beverlee G. Steinberg NAME <u>37,736</u> REGISTRATION NUMBER	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PCT International Application of )  
HENDRIK ARIEN DIRKSE; HUBERTUS )  
WILHELMUS ALBERTUS DRIES and LOUIS )  
EDWARD STEIN )  
)  
Int. Appl No.: PCT/EP99/08901 )  
)  
Int. Filing Date: 5 November 1999 ) 3 May 2001  
\_\_\_\_\_)

ASSISTANT COMMISSIONER FOR PATENTS  
Washington, DC 20231

Sir:

**PRELIMINARY AMENDMENT UNDER 37 CFR 1.115**

Applicants request entry of the following amendment prior to consideration of the claims pending in the application for reasons discussed below.

**IN THE CLAIMS**

Please amend Claims 3-8 to read as follows:

3. (Amended) Apparatus according to claim 1, wherein the total area of the openings of the sieve is greater than 5 times the cross sectional area of the dipleg.

4. (Amended) Apparatus according to claim 1, wherein a vortex stabilizer is positioned co-axial to the central axis below the opening of the gas outlet and above the sieve.

5. (Amended) Apparatus according to claim 4, wherein the vortex stabilizer is placed on top of the sieve.

6. (Amended) Apparatus according to claim 1, wherein the inlet means for the gas-solids feed are tangentially arranged at the upper part of the circular housing.

7. (Amended) Apparatus according to claim 1, wherein the sieve is a tube placed on top of the dipleg which tube protrudes the circular housing from below, has about the diameter of the dipleg, has an open lower end and a closed upper end and holes are present in the vertical walls of the tube.

8. (Amended) Fluid catalyst cracking process in which catalyst particles are separated from a gaseous reactor effluent in at least two sequential separation steps, wherein the apparatus according to claim 1 is used in the second step.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment.

**REMARKS**

Claims 1-8 remain pending in the application after entry of this amendment.

Claims 3-8 have been amended to more distinctly claim the subject matter which Applicants assert to be their invention in view of prior prosecution of original claims 1-8.

Applicants respectfully request consideration and early allowance of claims 1-8 as amended.

Respectfully submitted,

HENDRIK ARIEN DIRKSE; HUBERTUS  
WILHELMUS ALBERTUS DRIES and LOUIS  
EDWARD STEIN

By Beverlee G. Steinberg  
Their Attorney, Beverlee G. Steinberg  
Registration No. 37,736  
(713) 241-7256

P. O. Box 2463  
Houston, Texas 77252-2463

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

3. (Amended) Apparatus according to [any one of claims 1-2] claim 1,  
wherein the total area of the openings of the sieve is greater than 5 times the cross sectional  
area of the dipleg.

4. (Amended) Apparatus according to [any one of claims 1-3] claim 1,  
wherein a vortex [stabiliser] stabilizer is positioned co-axial to the central axis below the  
opening of the gas outlet and above the sieve.

5. (Amended) Apparatus according to claim 4, wherein the vortex [stabiliser]  
stabilizer is placed on top of the sieve.

6. (Amended) Apparatus according to [any one of claims 1-5] claim 1,  
wherein the inlet means for the gas-solids feed are tangentially arranged at the upper part of  
the circular housing.

7. (Amended) Apparatus according to [any one of claims 1-6] claim 1,  
wherein the sieve is a tube placed on top of the dipleg which tube protrudes the circular  
housing from below, has about the diameter of the dipleg, has an open lower end and a closed  
upper end and holes are present in the vertical walls of the tube.

8. (Amended) Fluid catalyst cracking process in which catalyst particles are  
separated from a gaseous reactor effluent in at least two sequential separation steps, wherein  
the apparatus according to [any one of claims 1-7] claim 1 is used in the second step.

Rec'd PCT/PTO 03 MAY 2001

SEPARATOR APPARATUSBackground of the invention

The invention is directed to a separator apparatus for separating solids from a gas-solid containing feed resulting in a gas-rich stream, the separator comprising:

5 an upright hollow circular housing fluidly connected to a dipleg for discharging solids positioned below the housing;

10 a gas outlet tube for discharging the gas-rich stream from the circular housing, which outlet tube protrudes substantially co-axial from the top of the housing;

15 inlet means for the gas-solids feed so arranged to create, in use, a vortex flow in the circular housing.

Such an apparatus is described in US-A-5391289. This patent publication describes a cyclone separator which is used as a secondary separation step to separate solid catalyst particles from the reactor effluent of a fluid catalytic cracking (FCC) reactor. In a FCC process hydrocarbons are cracked at high temperature in the presence of a solid catalyst to more desired components, for example gasoline and lower olefins. In the field of FCC these cyclone separators are also referred to as secondary cyclones. Other publications describing these secondary cyclones in a FCC process are for example US-A-5055177, US-A-5376339, EP-A-299650, EP-A-488549 and EP-A-309244.

20 25 30 A disadvantage of these secondary cyclones is that coke deposit may form on the walls of these apparatuses. Coke forming is a result of the hydrocarbons present in the feed to the cyclone and the relatively high temperatures of the gasses fed to the cyclones. Large pieces of coke can fall from the wall into the dipleg and

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cause to clog the dipleg. When a dipleg is clogged the cyclone will not function in an optimal manner as a solid-gas separator and the fluid catalytic cracking process will have to be shut down in order to remove the coke from the dipleg. Because FCC processes are expected to run many months and even years between planned shutdowns any unexpected shutdown will cause considerable economic damage.

The object of this invention is to avoid the problems associated with clogging of the diplegs of the separator apparatus.

Summary of the invention

The object is achieved by the following apparatus. A separator apparatus for separating solids from a gas-solid containing feed resulting in a gas-rich stream, the separator comprising:

an upright hollow circular housing fluidly connected to a dipleg for discharging solids positioned below the housing; a gas outlet tube for discharging the gas-rich stream from the circular housing, which outlet tube protrudes substantially co-axial from the top of the housing, inlet means for the gas-solids feed so arranged to create, in use, a vortex flow in the circular housing; and a sieve positioned between the lower part of the circular housing and the upper part of the dipleg, which sieve has openings which do not allow particles having a diameter greater than 0.75 times the diameter of the dipleg to pass the sieve and enter the dipleg and wherein the total area of the openings in the sieve is greater than 2 times the cross sectional area of the dipleg.

It has been found that when such a sieve is used less problems due to clogging of the dipleg occur. Because of the sieve a reduction of the normal swirl movement in the dipleg is observed. As a result the pressure difference per length of dipleg will increase making it possible to

use a shorter dipleg. This is very advantageous, especially when these cyclones are present within a vessel, for example a stripping vessel of a FCC process. The length of a dipleg is often the determining factor for the dimensions of the vessel. Thus shorter diplegs result in that smaller vessels can be employed.

#### Brief description of the drawings

The invention shall be further elucidated by means of the following figures. Figure 1 represent a vertical cross section of the separator apparatus according the invention. Figure 2 represents another embodiment of the invention, wherein the lower part of the housing is not present. Figure 3 represents a possible embodiment for a sieve combined with a vortex stabiliser. Figure 4 represents the upper part of a stripping vessel of a FCC process.

#### Detailed description of the invention

Preferably the openings of the sieve do not allow particles greater than 0.5 times the diameter ( $D_0$ ) of the dipleg to pass the sieve.

Preferably the total area ( $A_0$ ) of the openings of the sieve is greater than 5 times the cross sectional area ( $A_1$ ) of the dipleg.

The circular housing of the separator may suitably have an upper tubular portion with a diameter ( $D_3$ ), a conical formed housing as a middle portion of which smaller diameter ( $D_2$ ) is at the lower end and optionally a lower part having a diameter ( $D_1$ ) which is greater than the diameter ( $D_2$ ) of the lower part of the conical housing. The diameter ( $D_0$ ) of the dipleg is suitably smaller than the diameter ( $D_3$ ) of the upper part of the circular housing of the separator. Preferably the volume of the circular housing at the level where the sieve is located is sufficiently large to allow coke particles to accumulate. The dimensions of the sieve will be so chosen

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that while coke particles accumulate in the lower part of the housing a sufficiently large number of openings are not blocked in order to allow the separated particles to enter the dipleg. The form of the holes is not very critical. Circular, rectangular holes and slots are possible forms for the openings in the sieve.

The sieve is preferably positioned symmetrically around the axis just on top of the inlet opening of the dipleg. One embodiment of the invention is where the sieve is a tube placed on top of the dipleg which tube protrudes the circular housing from below. The tube has about the diameter of the dipleg and has an open lower end and a closed upper end. In the vertical walls of the tube holes are present.

The sieve is preferably sufficiently strong to avoid it being damaged by erosion due to the gas-solids moving in the circular housing. Protective linings can be applied to protect the upper part of the sieve. A more preferred method of protecting the sieve is by positioning a vortex stabiliser below the opening of the gas outlet tube and above the sieve. The vortex, present in use, will end at the top of the vortex stabiliser thereby reducing erosion of the sieve. The vortex stabiliser will additionally further reduce any swirl movement in the dipleg and thus increases the pressure difference per length of dipleg, which is advantageous for the reasons set out earlier.

The vortex stabiliser comprises suitably of a hat having a relatively large diameter and a vertically oriented vortex stabiliser rod placed on top of the hat having a considerably smaller dimension relative to the hat. The hat may be for example a circular plate or a cone. When a cone is used the top of the cone may function as a vortex stabiliser rod. Vortex stabilisers

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are also described in for example US-A-4692311,  
EP-A-360360 and EP-A-220768.

A preferred embodiment is where the vortex stabiliser  
is placed on top of the sieve.

5       The vortex stabiliser may have a hollow tube as  
vortex stabiliser rod, wherein a fluid connection is  
present via the hollow tube between the top of the vortex  
stabiliser and a position below the vortex stabiliser and  
above the inlet of the dipleg.

10      The inlet means for the gas-solids feed can be  
axially or tangentially arranged at the upper tubular  
part of the circular housing.

15      The apparatus is preferably used as the second  
separation step (also referred to as secondary cyclone)  
to separate catalyst particles from a gaseous reactor  
effluent of a fluid catalyst cracking process in which  
the separation is conducted in at least two sequential  
separation steps.

20      A fluid catalytic cracking process comprises a  
reactor in which catalyst particles and gaseous  
hydrocarbons are contacted. The reactor is generally a  
vertically positioned tubular reactor often referred to  
as the riser reactor through which catalyst and reactants  
co-currently flow in an upwards direction. At the end of  
the riser the catalysts are separated from the reactor  
effluent. This separation is usually effected by means of  
one or more cyclones. The thus separated catalysts are  
collected in a stripping vessel. In this vessel the  
catalysts are stripped with a water containing gas to  
separate any hydrocarbons from the catalyst. The stripped  
catalysts are subsequently sent to a regenerator vessel  
in which any coke is removed from the catalyst by means  
of combustion. The stripped and regenerated catalyst is  
reused in the process.

The separation of catalyst from the reactor effluent is suitably performed by means of a first separator which separates the bulk of the catalyst, followed by a secondary cyclone which separates most of the remaining catalyst particles. Depending on the specific layout more than one secondary cyclone may be present operating parallel and/or in series of each other. These separator means may be placed inside the stripping vessel or outside the stripping vessel. Combinations of the two are also possible, wherein the primary separation means is placed inside the stripping vessel and the secondary cyclone is placed outside the stripping vessel. The advantages of the invention are especially apparent when the secondary cyclone is placed inside the stripping vessel because these cyclones cannot be easily inspected when the FCC process is in operation. Examples of such FCC configurations are described in the earlier cited patent publications US-A-5055177, US-A-5391289, EP-A-309244 and EP-A-299650. If the secondary cyclone is placed inside the stripping vessel the gas-solids feed inlet is preferably tangentially arranged.

Preferably both the primary separation means, suitably a cyclone also referred to as the rough cut cyclone, and the secondary cyclone are placed inside the stripping vessel. More preferably the gas outlet of the rough cut cyclone is in fluid connection with the inlet of the secondary cyclone. This is advantageous because the residence time of the cracked hydrocarbons after they leave the reactor riser in the different separation means is hereby reduced so as to avoid non-controlled cracking also referred to as after cracking. In order to have an outlet means for the stripping gases in the stripping vessel an opening is present in the conduit between the rough cut cyclone and the secondary cyclone. Preferably this opening is effected by a slit.

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In Figure 1 a separator apparatus according the invention is shown having a hollow circular housing (1), symmetrical around an axis (Ax), fluidly connected to a dipleg (8) a gas outlet tube (4), inlet means (3) for the gas-solids feed, tangentially arranged to create, in use, a vortex flow in the circular housing (1). The inlet means (3) is fluidly connected to an inlet conduit (2). The circular housing (1) has upper tubular portion (5) with a diameter (D3), a frusto-conical envelope as a middle portion (6) of which smallest diameter (D2) is at the lower end and a lower part (7) having a diameter (D1). A tubular sieve (9) with circular openings (10) covers the inlet of the dipleg (8). Also shown is a vortex stabiliser (11) positioned on a hat (12).

In Figure 2 the numbers have the same meaning as in Figure 1. The embodiment disclosed in Figure 2 differs from the one disclosed in Figure 1 in that no widened lower part of the housing is present.

In Figure 3 a tubular sieve (9) is shown with rectangular openings (10) covering the inlet of the dipleg (8) placed in the lower part (7) of the housing. On top of the sieve a vortex stabiliser (11) is positioned. The hat(12) of the vortex stabiliser forms the top of the tubular sieve (9).

Figure 4 represents a preferred stripping vessel (16) of a FCC process having a secondary cyclone according the invention. The upper part of the stripping vessel is shown in which a reactor riser (17) is fluidly connected to a rough cut cyclone (18), which rough cut cyclone is fluidly connected with a gas outlet conduit (19). In the horizontal part of this conduit (19) a slit (21) is present. Conduit (23) is in fluid connection with the tangentially arranged inlet of the secondary cyclone (24). The secondary cyclone (24) has a tubular sieve (25) covering the inlet of the dipleg (26). The

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gaseous product poor in catalyst particles leave the secondary cyclone and the stripping vessel via conduit (27). The lower part of the stripping vessel comprises a fluid bed of catalyst particles (28) to which stripping gas is supplied to via inlet means (29). The dipleg (26) of the secondary cyclone ends about at the upper level of the fluidized bed (28) and the dipleg of the rough cut cyclone (30) ends within the fluidized bed (28). Through the slit (21) stripping gases can enter the inlet of conduit (23) and leave via the secondary cyclone (24) the stripping vessel (16).

TOP SECRET \* SECURITY INFORMATION

C L A I M S

1. A separator apparatus for separating solids from a gas-solid containing feed resulting in a gas-rich stream, the separator comprising:

5       an upright hollow circular housing fluidly connected to a dipleg for discharging solids positioned below the housing;

10      a gas outlet tube for discharging the gas-rich stream from the circular housing, which outlet tube protrudes substantially co-axial from the top of the housing;

15      inlet means for the gas-solids feed so arranged to create, in use, a vortex flow in the circular housing;

20      and a sieve positioned between the lower part of the circular housing and the upper part of the dipleg, which sieve has openings which do not allow particles having a diameter greater than 0.75 times the diameter of the dipleg to pass the sieve and enter the dipleg and wherein the total area of the openings in the sieve is greater than 2 times the cross sectional area of the dipleg.

25      2. Apparatus according to claim 1, wherein the openings of the sieve do not allow particles greater than 0.5 times the diameter of the dipleg to pass the sieve.

30      3. Apparatus according to any one of claims 1-2, wherein the total area of the openings of the sieve is greater than 5 times the cross sectional area of the dipleg.

25      4. Apparatus according to any one of claims 1-3, wherein a vortex stabiliser is positioned co-axial to the central axis below the opening of the gas outlet and above the sieve.

30      5. Apparatus according to claim 4, wherein the vortex stabiliser is placed on top of the sieve.

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6. Apparatus according to any one of claims 1-5, wherein the inlet means for the gas-solids feed are tangentially arranged at the upper part of the circular housing.

7. Apparatus according to any one of claims 1-6, wherein the sieve is a tube placed on top of the dipleg which tube protrudes the circular housing from below, has about the diameter of the dipleg, has an open lower end and a closed upper end and holes are present in the vertical walls of the tube.

10 8. Fluid catalyst cracking process in which catalyst particles are separated from a gaseous reactor effluent in at least two sequential separation steps, wherein the apparatus according to any one of claims 1-7 is used in the second step.

THERMOCOMPTEC 960

Fig.1.

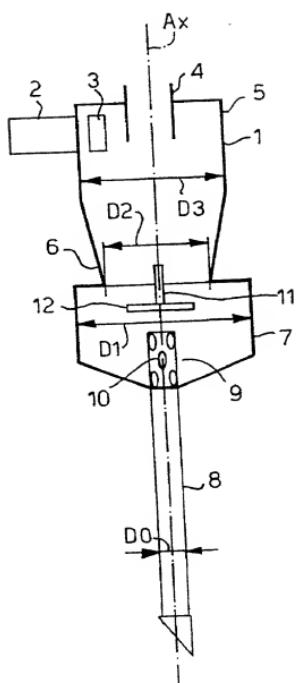


Fig.2.

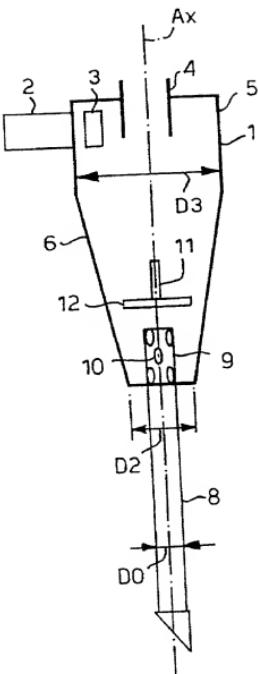


Fig.3.

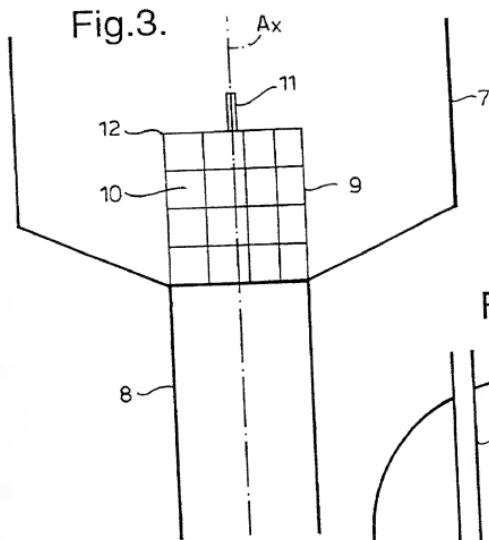
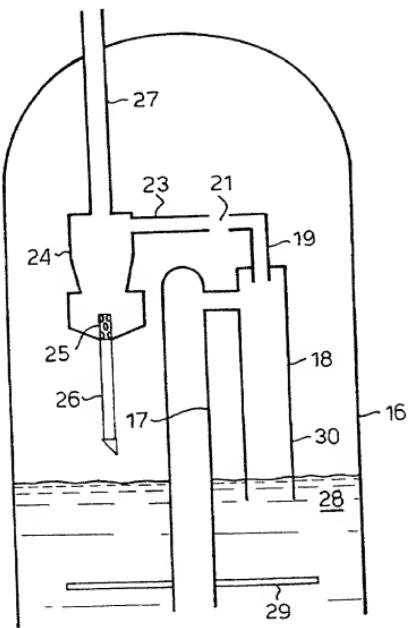


Fig.4.



# DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ATTORNEY'S DOCKET NO.  
TS 0764 USA P

SEPARATOR APPARATUS \_\_\_\_\_ the specification of which is attached hereto unless the following box is checked:

was filed on 5 NOVEMBER 1999 as United States Application Number or PCT International Application Number PCT/EP99/08901 and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

PRIORITY FOREIGN APPLICATION(S)			Priority Not Claimed
APPLICATION NUMBER	COUNTRY	DAY/MONTH/YEAR FILED	
<u>60/107420</u>	<u>US</u>	<u>06 November 1998</u>	<input type="checkbox"/>
<u> </u>	<u> </u>	<u> </u>	<input type="checkbox"/>

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

APPLICATION SERIAL NO.	FILING DATE
<u> </u>	<u> </u>

APPLICATION SERIAL NO.	FILING DATE	STATUS-PATENTED, PENDING, ABANDONED
<u> </u>	<u> </u>	<u> </u>

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or § 365(c) of any PCT International application designating the United States, listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

APPLICATION SERIAL NO.	FILING DATE	STATUS-PATENTED, PENDING, ABANDONED
<u> </u>	<u> </u>	<u> </u>

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

NAME <u>Richard F. Lemuth</u>	ATTORNEY/AGENT <u>Attorney</u>	REGISTRATION NUMBER <u>30,081</u>	TELEPHONE NUMBER <u>(713) 241-3716</u>
NAME <u>Beverlee G. Steinberg</u>	ATTORNEY/AGENT <u>Attorney</u>	REGISTRATION NUMBER <u>31,736</u>	TELEPHONE NUMBER <u>(713) 241-7256</u>

Revised June 1995

## SEND CORRESPONDENCE TO:

(NAME) RICHARD F. LEMUTH  
c/o Shell Oil Company  
Intellectual Property  
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# DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE OR FIRST INVENTOR (given name, family name)

**DIRKSE Hendrik Arien**

INVENTOR'S SIGNATURE

*Hendrik A. Dirkse*

DATE SIGNED

*18 Oct 1999*

RESIDENCE

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18 October 1999

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FOURTH INVENTOR'S SIGNATURE

DATE SIGNED

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FULL NAME OF FIFTH JOINT INVENTOR, IF ANY (given name, family name)

FIFTH INVENTOR'S SIGNATURE

DATE SIGNED

RESIDENCE

CITIZENSHIP

POST OFFICE ADDRESS